

Abstract

A device comprising a number of different wavelength-selective active-layers arranged in a vertical stack, having band-alignment and work-function engineered lateral contacts to said active-layers, consisting of a contact-insulator and a conductor-insulator. Photons of different

5 energies are selectively absorbed in or emitted by the active-layers. Contact means are arranged separately on the lateral sides of each layer or set of layers having the same parameters for extracting charge carriers generated in the photon-absorbing layers and/or injecting charge carriers into the photon-emitting layers. The device can be used for various applications: wavelength-selective multi-spectral solid-state displays, image-sensors, light-valves, light-emitters, etc. It can also be used for multiple-band gap solar-cells. The architecture of the device can be adapted to produce coherent light.

10

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